

1. Record Nr.	UNINA9910450899403321
Titolo	Model based learning and instruction in science [[electronic resource] /] / John J. Clement, editor, Mary Anne Rea-Ramirez, editor
Pubbl/distr/stampa	[New York], : Springer, c2008
ISBN	1-281-13800-2 9786611138004 1-4020-6494-2
Edizione	[1st ed. 2008.]
Descrizione fisica	1 online resource (288 p.)
Collana	Models and modeling in science education ; ; 2
Altri autori (Persone)	ClementJohn <1942-> Rea-RamirezMary Anne
Disciplina	507 507.1
Soggetti	Science - Study and teaching - Simulation methods Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	Basic Concepts and Background for Model Based Learning -- Student/Teacher Co-construction of Visualizable Models in Large Group Discussion -- An Instructional Model Derived from Model Construction and Criticism Theory -- to Model Based Teaching Strategies -- Determining Target Models and Effective Learning Pathways for Developing Understanding of Biological Topics -- Co- construction and Model Evolution in Chemistry -- Target Model Sequence and Critical Learning Pathway for an Electricity Curriculum Based on Model Evolution -- Case Study of Model Evolution in Electricity: Learning from Both Observations and Analogies -- Qualitative Research on Specific Strategies -- A Competition Strategy and Other Modes for Developing Mental Models in Large Group Discussion -- What If Scenarios For Testing Student Models in Chemistry -- Applying Modeling Theory to Curriculum Development: From Electric Circuits to Electromagnetic Fields -- Developing Complex Mental Models in Biology Through Model Evolution -- Role of Discrepant Questioning Leading to Model Element Modification -- Using Analogies in Science Teaching and Curriculum Design: Some

Guidelines -- Model Based Reasoning Among Inner City Middle School Students -- Six Levels of Organization for Curriculum Design and Teaching.

Sommario/riassunto

This book describes new, model based teaching methods for science instruction. It presents research that describes these new methods in a very diverse group of settings: middle school biology, high school physics, and college chemistry classrooms. Mental models in these areas such as understanding the structure of the lungs or cells, molecular structures and reaction mechanisms in chemistry, or causes of current flow in electricity are notoriously difficult for many students to learn. Yet these lie at the core of conceptual understanding in these areas. The studies focus on a variety of teaching strategies such as discrepant questioning, analogies, animations, model competition, and hands on activities. Five different levels of organization for teaching strategies are described, from those operating over months (design of the sequence of units in a curriculum) to those operating over minutes (teaching tactics for guiding discussion minute by minute).